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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/658,224	09/08/2003	Edward Colton Greene	NVIDP224B/P000872	5350
28875	7590	10/06/2005	EXAMINER	
Zilka-Kotab, PC P.O. BOX 721120 SAN JOSE, CA 95172-1120			NGUYEN, PHU K	
			ART UNIT	PAPER NUMBER
			2673	

DATE MAILED: 10/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/658,224

Applicant(s)

GREENE ET AL.

Examiner

Phu K. Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 July 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3, 6-9, 12-14 and 16-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 6-9, 12-14, 16-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
- Paper No(s)/Mail Date _____.

- 4) ☐ Interview Summary (PTO-414)
- Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

Phu K. Nguyen
PHU K. NGUYEN
PRIMARY EXAMINER
GROUP 2300

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The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-3, 6-9, 12-14, and 16-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over GREENE et al. (Hierarchical Z-buffer Visibility) in view of DEHMLow et al. (5,999,187).

As per claim 1, Greene teaches the claimed "graphics system including a scene manager, geometric processor means, renderer means, Z-pyramid, and a far clipping plane" (Greene, page 2, column 2 to page 3, column 1, section 3.1, Object space octree). It is noted that Greene does not explicitly teach the far clipping plane is updated "based on the farthest depth value in a depth buffer" as claimed. However,

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Dehmlow teaches that the updating of far clipping plane based on the farthest depth value in said hierarchical depth buffer means is well known in the art (Dehmlow, column 12, lines 43-63; both of near and far clipping planes are dynamically updated based on the closest and farthest cells, respectively). It would have been obvious to update the far clipping plane because it improves the z-buffer resolution and accuracy of graphics selection mechanism (Dehmlow, column 12, lines 49-53).

As per claim 2, Greene teaches the claimed "graphics system", comprising: a geometric processor; z-pyramid; a renderer; and a far clipping plane" (Greene, page 2, column 2 to page 3, column 1, section 3.1, Object space octree). It is noted that Greene does not explicitly teach the far clipping plane is updated "substantially based on a farthest depth value" as claimed. However, Dehmlow teaches that the updating of far clipping plane based on the farthest depth value in said hierarchical depth buffer means is well known in the art (Dehmlow, column 12, lines 43-63; both of near and far clipping planes are dynamically updated based on the closest and farthest cells, respectively). It would have been obvious to update the far clipping plane because it improves the z-buffer resolution and accuracy of graphics selection mechanism (Dehmlow, column 12, lines 49-53).

Claim 3 adds into claim 2 "a scene manager" which Greene teaches in page 5, column 2, Graphics Hardware).

Claim 6 adds into claim 2 "the culling stage is coupled between the geometric processor and the renderer" which Greene teaches in the culling process (page 2,

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column 2, hierarchical visibility describes the process of culling the hidden objects) in which the culling is performed after the process of inputted geometric data and before the rendering the objects for display.

Claim 7 adds into claim 2 "the far clipping plane is updated based on the farthest depth value" which Greene does not explicitly teach. However, Dehmlow teaches that the updating of far clipping plane based on the farthest depth value in said hierarchical depth buffer means is well known in the art (Dehmlow, column 12, lines 43-63; both of near and far clipping planes are dynamically updated based on the closest and farthest cells, respectively). It would have been obvious to update the far clipping plane because it improves the z-buffer resolution and accuracy of graphics selection mechanism (Dehmlow, column 12, lines 49-53).

Claims 8-9, 12 claim a method based on the system of claims 1-3, 6-7, therefore, they are rejected under the same reason.

Claims 13-14 claim a computer program product to perform the function of the system of claims 1-3, 6-7 which Greene teaches in the implementation of these function in a software programmed in C (page 71, column 2, Implementation); therefore, they are rejected under the same reason.

Claim 16 adds into claim 2 "the updating includes resetting the far clipping plane to the farthest depth value" which Greene does not explicitly teach. However, Dehmlow teaches that the updating of far clipping plane based on the farthest depth value in said hierarchical depth buffer means is well known in the art (Dehmlow, column 12, lines 43-63; both of near and far clipping planes are dynamically updated based on

the closest and farthest cells, respectively). It would have been obvious to update the far clipping plane because it improves the z-buffer resolution and accuracy of graphics selection mechanism (Dehmlow, column 12, lines 49-53).

Claim 17 adds into claim 2 "the farthest depth value is included in a tip of the z-pyramid" which Green teaches in the page 3, column 2, in which the culling process goes through the coarsest level of the z-pyramid.

Claim 18 adds into claim 17 "the tip of the z-pyramid further includes a coarsest NxN tile in the z-pyramid" (Green, page 3, column 2, section 3.2, image space z-pyramid).

Claim 19 adds into claim 18 "the tip of the z-pyramid further includes additional levels of the z-pyramid" which Green teaches in the page 3, column 2, in which the culling process goes through from the finest to the coarsest level of the z-pyramid.

Claim 20 adds into claim 17 "the tip of the z-pyramid includes a low-resolution z-pyramid with lower resolution than another z-pyramid maintained by a culling stage of the graphics system" which Green teaches in the page 3, column 2, in which the culling process goes through from the finest or high resolution to the coarsest level or low resolution of the z-pyramid.

Claim 21 adds into claim 17 "the tip of the z-pyramid includes a low-resolution z-pyramid with lower resolution than another z-pyramid maintained by a hierarchical

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rendering stage of the graphics system" which Greene teaches in page 3, column 2, section 3.2, image space z-pyramid and page 5, column 2, Graphics Hardware.

Claim 22 adds into claim 17 "depth values of the z-pyramid are encoded" which the cited references do not teach. However, the encoded stored data, which is well known in the art, can be applied for data in z-buffer for a motivation of reducing the storage requirement.

Claim 23 adds into claim 22 "the depth values of the z-pyramid are encoded for reducing storage requirements" which would have been obvious because as argued above, the encoded data will be in a compressed form and would need less memory to store them..

Claim 24 adds into claim 2 "the updating accelerates a culling of a box since a depth of a nearest comer of the box is farther than the farthest depth value" which Dehmlow teaches the update (Dehmlow, column 12, lines 43-63; both of near and far clipping planes are dynamically updated based on the closest and farthest cells, respectively) and Green provides a culling of box in Octree,(page 3, column 1). It would have been obvious to update the far clipping plane because it improves the z-buffer resolution and accuracy of graphics selection mechanism (Dehmlow, column 12, lines 49-53).

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phu K. Nguyen whose telephone number is (571) 272 7645. The examiner can normally be reached on M-F 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, bipin Shalwala can be reached on (571) 272 7681. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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Phu K. Nguyen
October 3, 2005



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